



Form GSOP 1-PIN (04/98)

STATE OF CALIFORNIA  
Department of General Services - Office of Procurement

**PURCHASE ORDER**

Page 1

Purchase Order No. Rev. Date  
62237 6/30/2008

|  |                                      |   |                          |               |
|--|--------------------------------------|---|--------------------------|---------------|
| Supplier No.<br>740087   | Solicitation No.<br>56962            | Delivery Date<br>150 Days ARO   | FOB Point<br>Destination | Invoice Terms |
| <i>S</i> DEPT OF CONSERVATION<br><i>h</i> STRONG MOTION INSTR, PRGM<br><i>i</i> 801 K STREET, MS 13-35<br><i>p</i> SACRAMENTO, CA 95814-3531 |                                      | <i>C</i> CONSERVATION A-51<br><i>h</i> ACCOUNTING<br><i>a</i> 801 K STREET MS 13-35<br><i>t</i> SACRAMENTO CA 95814<br><i>r</i><br><i>o</i><br><i>g</i><br><i>e</i> |                          |               |
| Agency Billing<br>13054  | Agency Purchase Estimate<br>1E7SB071 | Purchase Estimate<br>67212  | Revision<br>0            |               |
| Agency Contact<br>ANTHONY F. SHAKAL  |                                      | Phone<br>916-322-7481   | Date Received            |               |

DVBE TECH INC  
5060 SUNRISE BLVD  
SUITE A-4  
FAIR OAKS, CA 95628  
Attn: JULIAN OGANS

Phone: 916-960-0116

| Item No.   | Quantity | Unit | Commodity Code  | Description   | Unit Price  | Extension  |
|--|----------|------|-----------------|---|-------------|------------|
| <p>THE GENERAL PROVISIONS FOR NON-IT COMMODITIES ARE HEREBY INCORPORATED BY REFERENCE. THESE GENERAL PROVISIONS CAN BE OBTAINED BY PHONING (916) 375-4400 OR BY ACCESSING OUR WEBSITE AT:<br/> <a href="http://www.documents.dgs.ca.gov/pd/modellang/GPnonIT0407.pdf">www.documents.dgs.ca.gov/pd/modellang/GPnonIT0407.pdf</a></p> <p>THE FOLLOWING INFORMATION IS PROVIDED FOR AGENCY USE ONLY:</p> <p>PRIME CONTRACTOR: SB/DVBE<br/>FISCAL YEAR: 2007/2008<br/>APPLICATION OF DVBE INCENTIVE RESULTED IN AWARD: YES</p> |          |      |                 |   |             |            |
| 1  | 7        | EA   | 6655-665-0100-2 | ACCELEROGRAPH (AS DESCRIBED)<br>12-CHANNEL CENTRAL RECORDING MULTICHANNEL RECORDER SYSTEM IN ACCORDANCE WITH THE ATTACHED SPECIFICATION #6655-0165 OF SEVEN (7) PAGES, DATED JUNE 12, 2008. | 22,648.0000 | 158,536.00 |
| <p>Brand: REF TEK<br/>Model: 130-MC12A</p>   |          |      |                 |   |             |            |
| 2  | 7        | EA   | 6655-665-0100-2 | ACCELEROGRAPH (AS DESCRIBED)<br>18 CHANNEL CENTRAL RECORDING MULTICHANNEL RECORDER SYSTEM IN ACCORDANCE WITH THE ATTACHED SPECIFICATION #6655-0165 OF SEVEN (7) PAGES, DATED JUNE 12, 2008. | 34,550.0000 | 241,850.00 |
| <p>Brand: REF TEK<br/>Model: 130-MC18A</p>   |          |      |                 |   |             |            |
| Total Value:   |          |      |                 |   |             | 400,386.00 |
| <p><u>F.O.B. DESTINATION</u><br/>For the purpose of this order only F.O.B. Destination will be accepted.</p> <p><u>ATTACHMENTS</u><br/>THE FOLLOWING ATTACHED DOCUMENTS ARE PART OF THIS PURCHASE ORDER.<br/>SPECIFICATION #6655-0165 OF SEVEN (7) PAGES, DATED JUNE 12, 2008.</p>   |          |      |                 |   |             |            |

Sales and/or use tax to be extra unless noted above

|  |                       |            |
|--|-----------------------|------------|
| Buyer<br><i>Kathleen Sanborn</i><br>KATHLEEN SANBORN | Phone<br>916-375-4403 | BOC Number |
|--|-----------------------|------------|

*Tom Ahoy*

**Department of General Services - Office of Procurement**

## Form GSOP 2-PIN (04/98)

Page 2

| Item No.  | Quantity | Unit | Commodity Code | Description | Unit Price | Extension |
|---|----------|------|----------------|-------------|------------|-----------|
| <u>DELIVERY INSTRUCTIONS</u>  |          |      |                |             |            |           |
| ALL DELIVERIES TO BE MADE DURING NORMAL BUSINESS HOURS MONDAY THROUGH FRIDAY 8:00 AM TO 3:30 PM, EXCEPT STATE HOLIDAYS.   |          |      |                |             |            |           |
| DELIVER TO: Department of Conservation<br>Strong Motion Instrument Programs<br>801 K Street<br>Sacramento, CA 95814-3531<br>Contact: Dr. Anthony F. Shakal<br>Phone: (916) 322-7481   |          |      |                |             |            |           |
| SUPPLIER MUST PROVIDE 72 HOURS NOTIFICATION OF DELIVERY TO THE CONTACT PERSON AT THE LOCATION ADDRESS.  |          |      |                |             |            |           |
| <u>DEMONSTRATION</u>  |          |      |                |             |            |           |
| Supplier shall demonstrate the equipment at the agency facility, prior to acceptance, to ensure product offered performs to the administrative and technical requirements of the bid.   |          |      |                |             |            |           |
| <u>WARRANTY</u>   |          |      |                |             |            |           |
| Equipment shall be warranted against defects in material and workmanship and shall operate satisfactorily under normal service for a minimum warranty period of one year from date of <u>ACCEPTANCE</u> by the State. Vendor shall bear all material, labor and transportation costs for repair of defects and failures occurring within the warranty period. During the warranty period (one year minimum), the vendor must provide technical assistance within 24 hours for calls during normal business hours, and stock adequate spares (complete assemblies as well as sub-assemblies) to replace defective recorders within 48 hours. |          |      |                |             |            |           |
| <u>TRAINING</u>   |          |      |                |             |            |           |
| Vendor shall provide, at vendor's expense and at agency facility, three 8-hour days of system training to agency-designated staff in the proper operation, safety and operator level maintenance aspects of the unit. This training shall include but not limited to installation, normal operation, theory of operation, maintenance, repair to component level and calibration procedures. This training time must be scheduled with the agency representative at his/her convenience.  |          |      |                |             |            |           |
| <u>OPERATORS MANUALS</u>  |          |      |                |             |            |           |
| Each unit shall be provided with an operator's manual.  |          |      |                |             |            |           |
| <u>ELECTRICAL &amp; MECHANICAL EQUIPMENT</u>  |          |      |                |             |            |           |
| All electrical and mechanical equipment furnished shall comply with the California Administrative Code; Title 8 (Industrial Safety Orders), Title 24 (State Building Standards Law) and Title 17 (Public Health). All electrical equipment furnished shall be grounded, with any exceptions only as approved in the referenced applicable titles.   |          |      |                |             |            |           |

## Department of General Services - Office of Procurement

## Form GSOP 2-PIN (04/98)

Page 3 (Last)

|                           |                 |             |                     |                      |
|---------------------------|-----------------|-------------|---------------------|----------------------|
| <i>Purchase Order No.</i> | <i>Revision</i> | <i>Date</i> | <i>Supplier No.</i> | <i>Supplier Name</i> |
| 62237                     |                 | 6/30/2008   | 740087              | DVBE TECH INC        |

| Item No.   | Quantity | Unit | Commodity Code | Description | Unit Price | Extension |
|--|----------|------|----------------|-------------|------------|-----------|
| <p><u>DOCUMENTATION</u></p> <p>Systems shall be delivered with complete documentation of final factory test measurements of recorder noise levels and the constants for each sensor (sensitivity, natural frequency, damping and cross-axis sensitivity), and description of method used to determine them; All parameters to be provided in paper report form and in a digital spreadsheet file. Additional documentation provided shall include operating and maintenance manuals, schematics, parts list, and written procedures for testing and calibration.</p> |          |      |                |             |            |           |
| <p><u>AWARD DATE</u></p> <p>This purchase order is being awarded on September 26, 2008, pursuant to Government Code Section 13332.17. Any encumbrances made pursuant to this purchase order shall be construed to have been made on the last day of the preceding fiscal year.</p>   |          |      |                |             |            |           |
| <p><u>SCPRS REGISTRATION</u></p> <p>This Purchase order has been registered into the state contract and procurement registration system (<a href="https://www.scprs.dgs.ca.gov/">https://www.scprs.dgs.ca.gov/</a>). The registration number is .4800908334892.</p>  |          |      |                |             |            |           |
| <p><u>CHANGE ORDERS</u></p> <p>This Purchase Order may be amended, modified, or terminated at any time by mutual agreement of the parties in writing. Change orders amending, modifying or terminating the Purchase Order, including any modifications of the compensation payable may be issued only by the State Procurement Officer. All such change orders shall be in writing and issued only upon written concurrence of the supplier. Termination, as that term is used in this section, does not include termination for default of the supplier.</p>        |          |      |                |             |            |           |



**STATE OF CALIFORNIA**  
**BID SPECIFICATION**  
**CENTRAL RECORDING MULTICHANNEL RECORDER SYSTEM**

6655-0165

**1 SCOPE**

This document establishes the requirements and specifications for a Central Recording Multichannel Accelerograph Recorder System that;

- 1.1 can function normally in extreme environmental elements of humidity, dust and temperature.
- 1.2 is a standard production model used by leading networks for recording strong motion.

**2 APPLICABLE SPECIFICATIONS / STANDARDS / CODES**

- 2.1 Specifications and standards referenced in this document in effect on the opening of the invitation for bid, form a part of this specification.
- 2.2 Upon written request, bidder shall submit certification that units and accessories furnished to meet specifications of this document comply with requirements of following standards/codes.
  - 2.2.1 FCC § 15 Class A for industrial/commercial electrical equipment.
  - 2.2.2 Underwriters Laboratories (UL) standard 50 for electrical equipment safety enclosures.
  - 2.2.3 UL standard 508 for Industrial Control Equipment.
  - 2.2.4 UL standard 94-V2 for Flammability of Plastic Materials for internal Parts.
  - 2.2.5 National Fire Protection Association (NFPA) code 70 for electrical conductors, equipment, signaling and communications conductors and raceways.
  - 2.2.6 Ingress Protection (IP) standard 67 for watertight integrity of electrical enclosures.
  - 2.2.7 National Electrical Manufacturers Association (NEMA) Type 6 for electrical enclosures.
  - 2.2.8 NEMA Type 4 for system enclosures.
  - 2.2.9 Latest Electro Static Discharge Association (ESDA) standard S541 for electrical components and enclosures.
  - 2.2.10 Unified Thread Standard (UTS) Class Unified Fine (UNF) 28 for screw threads.

**3 REQUIREMENTS**

**3.1 GENERAL OPERATION;**

- 3.1.1 Recorder shall remain in a standby condition, and start recording when actuated by strong shaking or manually activated for test purposes. After actuation, it shall stop recording after a set time or after shaking stops, and return to the standby condition, ready to record another earthquake without servicing or attention. Recording shall stop without overwriting previous events when memory becomes full.
- 3.1.2 Unit furnished shall have 6 to 18 channels capability.
- 3.1.3 Unit shall be battery powered with solid state memory and remote Accelerometers.
- 3.1.4 Shall be 18-bit or higher AD conversion, with appropriate anti-aliasing filtering
- 3.1.5 Shall be able to be installed and field-calibrated with a minimum of adjustment.
- 3.1.6 Shall consist of remote Accelerometers cabled to a central Recorder
- 3.1.7 Record accurately strong shaking (as high as 4g) without data loss or damage.

### 3.2 SYSTEM CHARACTERISTICS;

- 3.2.1 The noise level of the system (including Accelerometer, Recorder and interconnection) in the absence of shaking shall be a maximum of 0.030 mg (i.e., one count of an 18-bit system with 4g maximum acceleration).
- 3.2.2 Frequency response of the complete transducer-Recorder system shall be flat to within 1% from 0 to 40 Hz, and full documentation shall be provided to allow for accurate instrument correction of the data recorded. Any effects on the recorded data from signals or noise at frequencies higher than 100 Hz shall be <0.030 mg.
- 3.2.3 Recorder and Accelerometer shall reject spurious electronic and electromagnetic noise and interference from radio frequencies (RFI) as well as AC & other frequencies.
- 3.2.4 Recorder, Modem and Accelerometer shall also include effective protection against power and phone line surges and electrostatic discharge (ESD) effects.

### 3.3 ACCELEROMETERS;

Accelerometers are to be uniaxial or borehole force-balance type meeting the following specifications;

- 3.3.1 **Operating Acceleration Range:**  $\pm 4g$ ; full-scale output voltage of Accelerometer shall match the full-scale input of the Recorder.
- 3.3.2 **Accelerometer Frequency Response (Bandwidth):** Natural frequency of the unit shall be >45 Hz.
- 3.3.3 **Linearity:**  $\pm 1\%$  or  $1000\mu g/g^2$  error from negative to positive full scale.
- 3.3.4 **Accelerometer Noise:** <0.03 mg from 0 to 100 Hz.
- 3.3.5 **Cross-axis Sensitivity:**  $\leq 1\%$  g/g.
- 3.3.6 **Temperature Effects:** <2% over the required operating temperature range of 0 to 150°F (-20 to 70°C). Zero point thermal drift shall be <500 $\mu g/^{\circ}C$ .
- 3.3.7 **Function Testing:** Accelerometers shall produce calibration voltages during static tilt tests on all channels to allow verification of sensitivity constants. Accelerometer operation shall be verifiable via signal offset in response to signal command issued from the Recorder. Signal offset polarity and amplitude shall be documented and consistent for all channels.
- 3.3.8 **Accelerometer Zero Output (Zero Adjust):** Adjustable to 0,  $\pm 10mg$  after field installation to either a vertical or horizontal surface. Accelerometer zero value shall be stable over time, without steps or other changes during recording. Accelerometer zero adjustment mechanism, if present, shall lock securely so that the Accelerometer output resumes the pre-event zero level after earthquake shaking. If auto-zeroing of DC level is possible, it shall have the ability to be deactivated.
- 3.3.9 **Electrical Connections:** All electrical connections shall pass through sealed Military Spec "MS" type connectors. Signal and power commons shall be electrically isolated from the enclosure and the cable shield connections.
- 3.3.10 **Remote Operation:** Accelerometer must operate, without degradation of performance, up to 2000 feet (610 m) from the Recorder using standard cable with stranded 22 AWG gauge conductors. Each Accelerometer shall not require more than 4 twisted shielded pairs with individual drain wires.

- 3.3.11 Uniaxial Accelerometer Enclosure:** Accelerometer enclosure shall be <45 inches<sup>3</sup> (740 cc), crush-resistant (able to withstand 30 lb weight dropped from 3 feet), resistant to EMI/RFI, moisture proof (able to withstand occasional submersion in water; NEMA 6/IP67) and corrosion resistant, with a rigid mounting base, to match SMIP standard mounting plate. Enclosure shall be mountable to vertical or horizontal surfaces, and be able to sense vertical or horizontal motion in either position. Direction of positive acceleration shall be permanently marked on the outside of the enclosure.
- 3.3.12 Borehole Accelerometer Enclosure:** Package for deployment in a 4-inch ID cased borehole, containing three orthogonal accelerometers, two horizontal and one vertical (parallel to cylinder long axis). Enclosure shall be a 3 ±0.01 inches diameter 316 stainless steel case, 12 to 16 inches long. Enclosure top to be flat with centered, sealed connector for attachment of the removable downhole cable assembly connector. Enclosure bottom to be flat with a centered threaded 1/2 inch long stud, 3/4-16 UNF-28 thread, or equivalent. Enclosure to be resistant to EMI/RFI, sealed, and waterproof to withstand 800 psi. Enclosure to include a clearly visible permanent mark on the exterior related in a fixed way to the orientation of the internal horizontal Accelerometers.

#### **3.4 CENTRAL RECORDER;**

The central recording unit of the system shall be based on Recorder modules of 3 to 6 channels per module and be configurable by adding or deleting Recorder modules. All Recorder channels shall have unity gain or selectable gain in fixed steps, and meet the following specifications;

- 3.4.1 Sampling:** Recorded data sampling rate shall be 200 samples per second per channel. Anti-alias filtering of the analog signal from the Accelerometers or extraneous sources shall meet System Characteristics noise specification (see 3.2). Channel-to-channel sampling to be synchronized to within 0.2 msec.
- 3.4.2 Recorder Noise:** During normal operation, and when the Recorder transitions from the standby state to recording operation, the noise level shall not exceed the System Characteristics noise specification (see 3.2).
- 3.4.3 Temperature Effects:** <2% over required operating temp range of 0 to 150°F (-20 to 70°C).
- 3.4.4 GPS Timing:** Recorder shall record sample time information from the internal or external GPS receiver in the event header and in each file data block. Recorder shall also include an internal clock that is accurate to within 1 minute per month in the absence of GPS. Duty cycling of the GPS receiver shall be settable from 0% to 100%. Time and amount of last GPS update, GPS status information, and time-averaged location information (latitude, longitude and elevation) shall be available from the event header and via a status command. GPS receiver shall update internal clock when drift is greater than 0.5 msec. GPS antenna and receiver shall be locatable up to 1000 feet (300 m) from the Recorder without performance problems. Unit shall be delivered with 150 feet of plenum, outdoor (UV) rated antenna cable.
- 3.4.5 Event Run Time:** Pre-event run time shall be adjustable from 1 to 30 seconds. Post-event hold-on time shall be adjustable from 10 to 60 seconds.
- 3.4.6 Triggering:** Declaration of a triggered condition to depend on the acceleration (within the 0.1 - 12 Hz frequency band) and channel trigger voting. When the acceleration on a specified channel exceeds the trigger threshold level specified for that channel, that channel's specified

number of votes is added to the total votes for trigger. When the total number of votes reaches the minimum specified for triggering, a trigger condition is declared, and recording is to begin at the start of the next second. The triggering signal from another Recorder (see 3.4.18) is to be treated as a voting channel signal. Once a triggered condition is declared, recording shall continue until after the det trigger condition is met, dependent on the continuing motion and the channel det trigger voting. When the acceleration on a channel no longer exceeds the det trigger threshold level specified for that channel, continuously for the number of seconds specified by the post-event run time, that channel's specified number of votes is added to the total votes for det trigger, for as long as that condition continues. When the total number of votes reaches the specified minimum for det trigger, a det trigger condition is declared, and recording shall stop at the start of the next second. The signal from another Recorder (see 3.4.18) is to be treated as a channel signal with the exception that the post-event run time is not to be applied. For all channel signals, trigger and det trigger threshold levels shall be independently adjustable from 0.1 mg to full-scale. The number of votes for each channel shall be settable from 0 through 5 for both trigger and det trigger. The total number of votes required to trigger or det trigger the Recorder shall be independently settable from 0 through 9.

- 3.4.7 Function Tests:** Under user control, Recorder shall generate test signal commands to the Accelerometers to allow verifying Accelerometer operation from the recorded data. Recorder shall accommodate and record tilt tests on all 3 axes to allow calibration of the sensitivity constants of the Accelerometers.
- 3.4.8 Diagnostics/State of Health Monitoring:** Upon power up, and under user control at other times, Recorder shall perform internal self-checks and diagnostics to verify proper operation. Under user control, Recorder shall also provide, without generating an event, amount of available memory, firmware version number, timing, battery voltages, recording parameters and Accelerometer output levels (ambient and with offset signal applied). All Recorder configuration and operating parameters shall be written into a retrievable text file with a single command.
- 3.4.9 Data Storage:** A minimum of 60 minutes of data per channel shall be recorded, stored on standard memory cards (e.g., PC CARD, USB Flash Drive) readable by laptop PCs (MS® Operating System). Files on memory cards shall be individually deletable as well as globally deletable.
- 3.4.10 Batteries:** Entire system shall be powered by sealed internal and/or external 12-volt rechargeable DC batteries. Lithium batteries (if any) shall have a sealed stainless steel case. All batteries shall have the capability to be replaced without soldering.
- 3.4.11 Battery Charging:** Recorder shall include AC charging circuitry for maintaining the charge of the internal and/or external main batteries. Charger must be able to charge a completely discharged battery, and charging voltage and current shall be held within battery manufacturer guidelines.
- 3.4.12 Recovery after Loss of Power:** In the event of main battery failure, Recorder shall automatically return to normal operation (i.e., able to trigger and record data) once power is restored, without affecting retrievability of previously recorded data. In the event of long-term

power loss, recorded data shall be preserved in memory for at least 30 days without affecting data retrievability.

- 3.4.13 **Power Consumption:** Total power consumption at standby shall be <21 watt-hrs/day per channel (at 12vDC nominal), including power for the accelerometers, power for the GPS timing receiver with 5% duty cycling, and power for the modem (see 3.5.2) in the absence of calls. Internal charger shall be capable of charging sufficient external batteries for a minimum of 4 days autonomous operation.
- 3.4.14 **Recorder Enclosure:** The Recorder enclosure shall be made of engineering plastic, galvanized steel or stainless steel, resistant to EMI/RFI, NEMA 6/IP67 rated, and mount in the System enclosure. All electrical connections into the Recorder enclosure shall be through sealed connectors, or cables running through sealed strain reliefs. Normal maintenance procedures shall not require opening the Recorder.
- 3.4.15 **Deployment:** Installation of system enclosure shall require no onsite assembly/soldering.
- 3.4.16 **Electrical Connections:** System enclosure shall include a standard 125vAC, 20amp receptacle or power strip with adequate outlets for Recorder power and at least one additional AC outlet for test equipment. The electrical connections for the cables from the external accelerometers and the external timing device shall be plated to resist corrosion and require no soldering or crimping of terminal lugs.
- 3.4.17 **System Enclosure:** The system enclosure shall be wall-mountable, galvanized or stainless steel, crush resistant (able to withstand a 30lb weight dropped from 3 feet), NEMA-4 rated, complete with provisions for locking (using standard padlocks with 5/16" shackle). System enclosure shall provide adequate space for Recorder, associated components, and batteries needed for the required autonomous operation period (see 3.4.13). When fully equipped, the system enclosure shall have a maximum weight of 100 lbs (45 kg), exclusive of batteries, and shall be <5 Ft<sup>3</sup>. (0.15m<sup>3</sup>) in size.
- 3.4.18 **Interconnection of Recorder(s):** Central recording units shall be interconnectable with up to 5 other central recording units, located up to 4500 ft (1400m) apart, using standard cabling. Each recording unit shall provide a trigger signal for triggering other systems, which goes high on declaration of trigger by the Recorder and is held high until dettrigger conditions are met on the Recorder (trigger and de-trigger declarations occurring as specified in 3.4.6).

### 3.5 COMMUNICATION WITH RECORDER;

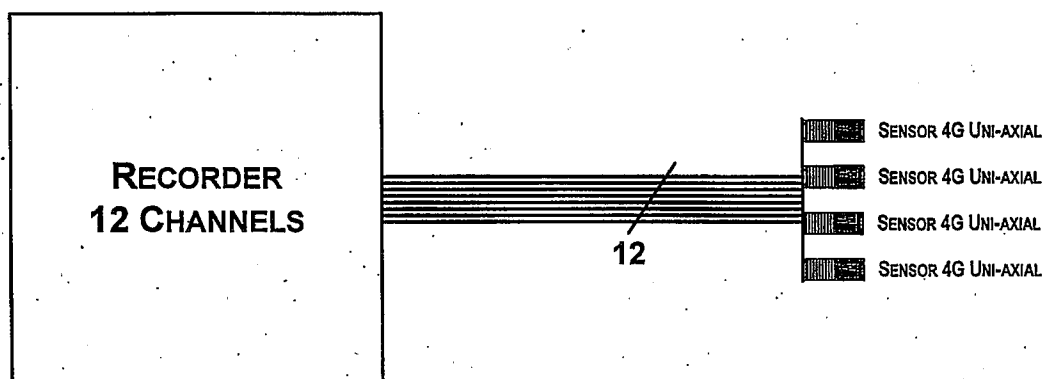
- 3.5.1 **Remote Communication:** Remote interrogation of the system state-of-health shall be available via the included 56 kbps or faster landline telephone modem (or optional external digital cellular modem), the RS-232 serial port, and the TCP/IP port without retrieving or altering the data in memory. The state-of-health information shall include battery voltages, battery charging status, GPS system status, amount of memory used, event count, and accelerogram parameters (including peak values, event length, time of trigger and channels causing trigger). The remote access shall allow performing all functions that the local on-site connection can perform (including data retrieval, upgrading the firmware, and functional and diagnostic tests) and shall include protection against unauthorized access. All interrogation and control shall be by means of ASCII-character commands from a PC in terminal mode.

- 3.5.2 Modem Power Control:** Modem (internal or external) shall normally be not powered, or in the absence of calls, use <3 watt-hrs/day at 12vDC. Modem, when active, shall use <225mA at 12vDC nominal. The Recorder shall, upon triggering, power the modem and initiate call-out within 5 seconds. For incoming calls, a ring-detect provision shall turn on the modem and answer the call. Modem control shall include  $\geq 5$  specifiable windows of time during which the modem and optional external cellular phone are powered. Modem and communication equipment shall remain powered for the duration of the call.
- 3.5.3 Triggered Communication:** Upon being triggered, Recorder shall auto-dial a remote computer, initiating dialing within <5 seconds. Recorder shall identify the name of the event file causing it to call-out. If the communication is unsuccessful, the unit shall re-attempt to communicate after successive time intervals doubling in length, starting at 15 seconds and increasing to 3 days, and maintain a retrievable log of the communication attempts. Recorder shall declare communication success only upon receipt of a specific "success" command from the remote computer for that event file.
- 3.5.4 Alarm Communication:** Recorder shall call a remote computer (see 3.5.3) upon detecting selectable equipment malfunctions (including at least low battery level and loss of AC) and indicate the reason for the call. Recorder shall also call out at a specifiable time or when user specifiable channels exceed specifiable "alarm" threshold levels.
- 3.5.5 Triggered Data Retrieval:** Recorded data shall be retrievable locally or remotely via modem, using a desktop or laptop PC and communication software using terminal mode and standard file transfer protocols (Xmodem, Ymodem, Zmodem), allowing data from the Recorder to be transferred rapidly to standard PC media. During data retrieval and interrogation, the system shall remain operational and record any events that occur. Peak acceleration values shall be updated during the event and be available for retrieval while the event is still being recorded. Data retrieval from memory shall yield an exact copy of the file, and not cause stored data to be erased. Vendor shall provide specification, operating system and interface software for the MS® Operating System Recovery computer.
- 3.5.6 Data Transfer:** Rate Data transfer rate (per three channels) shall be such that 1 minute of three-channel data is transferred in <1 minute (that is, on a per-channel basis, a transfer time of <20 seconds/channel for 60 seconds of data). Compression algorithm (if any) shall have a data-reconstruction error of <1 LSB from 0Hz to the Nyquist frequency.
- 3.5.7 Data Handling Software:** Data review and retrieval software shall be provided which operates on a MS® Operating System PC and provides for field review of data as well as output in an event file with well-documented format. Software shall include a stand-alone program to display and print the event header information in a summary form. Full documentation of the header and data layout in the raw event file shall be provided. File conversion software shall be provided (with documented source code) to convert the event file from native format to COSMOS Volume 0 Strong Motion Data Format, v 1.20 (<http://www.cosmos-eq.org>).
- 3.5.8 Continuous Data Transmission:** Simultaneously, and without affecting other operations, instrument shall be capable of continuous transmission of the digital data being recorded using full duplex real-time communication. Unit shall use a fully documented protocol

compatible with modern communications (Frame Relay, DSL, TCP/IP, etc) for input into a digital seismic monitoring system (e.g., Earthworm, etc.).

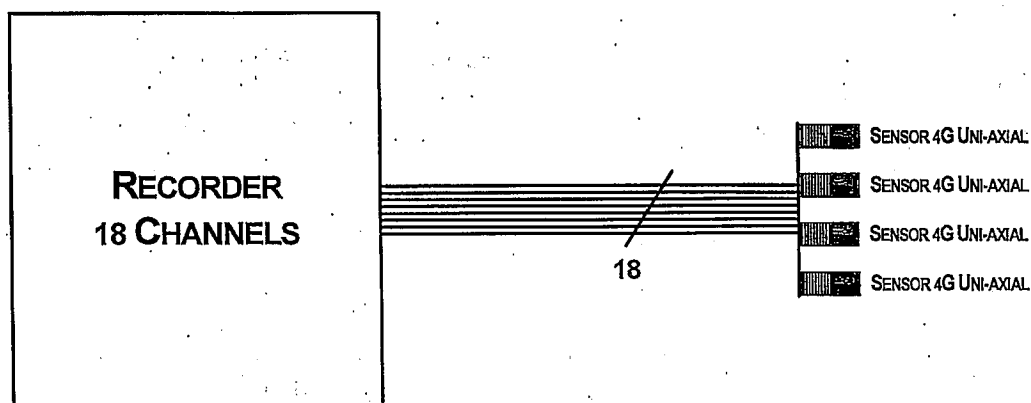
### 3.6 SYSTEM ITEM CONFIGURATIONS:

- 3.6.1 All cable assemblies (modem, telephone, GPS antenna, AC power, etc.) shall be delivered with the connectors mated to the cables.
- 3.6.2 Line 1 configuration to include internal modem, all mating connectors, GPS timing option with 150' antenna cable, battery charger (without internal main batteries), twelve 4g uniaxial accelerometers each with a pigtail consisting of a mating connector attached to 6' of plenum-rated cable.



Configuration for Line 1, Qty 7, DGS PE# 67212, Agency PE# 1E7SB071.

- 3.6.3 Line 2 configuration to include internal modem, all mating connectors, GPS timing option with 150' antenna cable, battery charger (without internal main batteries), eighteen 4g uniaxial accelerometers each with a pigtail consisting of a mating connector attached to 6' of plenum-rated cable.



Configuration for Line 2, Qty 7, DGS PE# 67212, Agency PE# 1E7SB071.